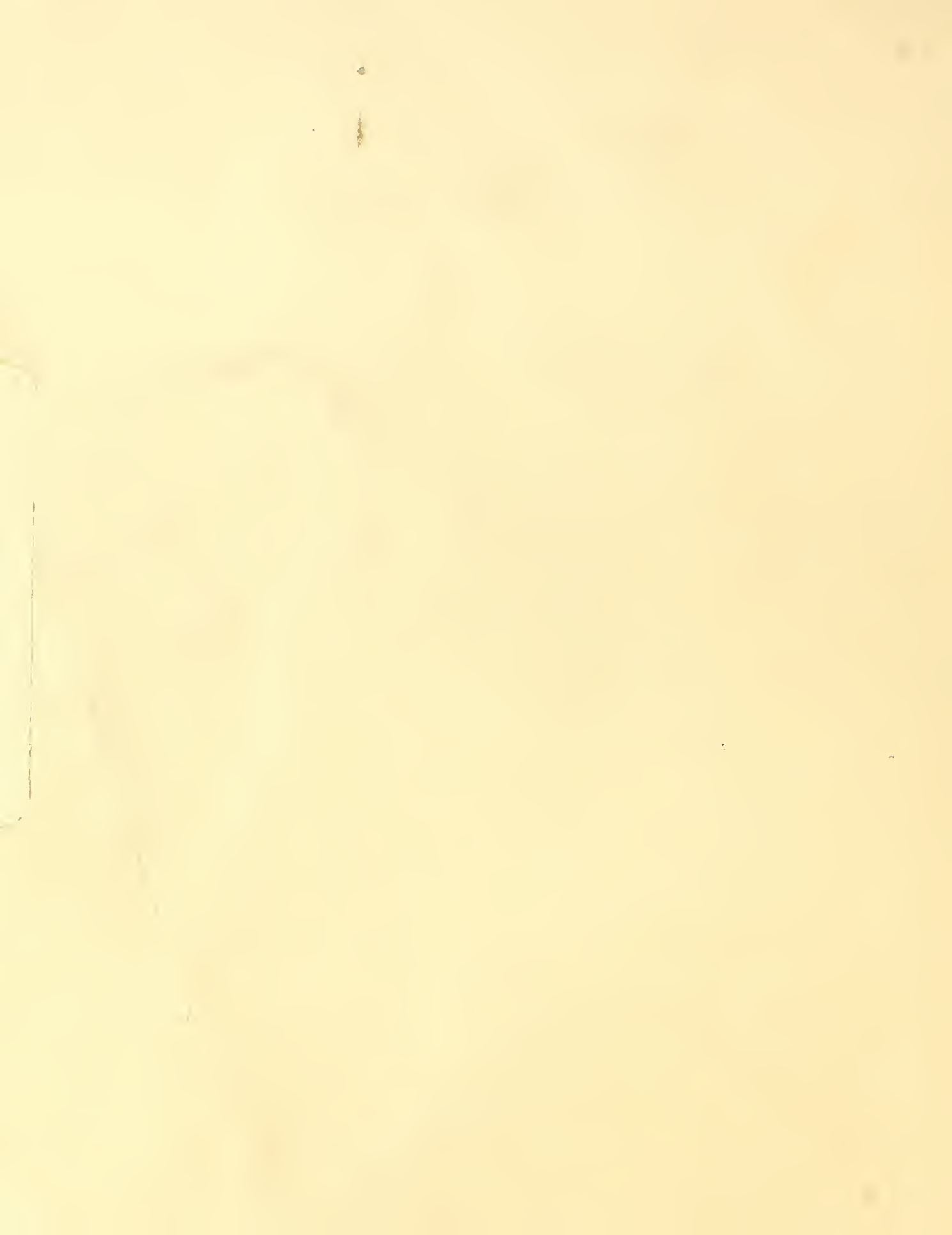


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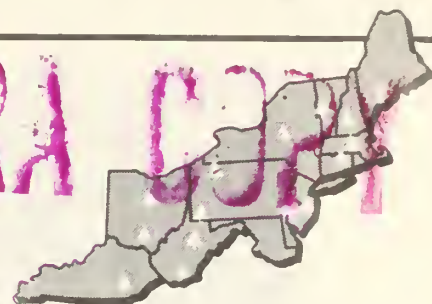
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# USDA FOREST SERVICE RESEARCH NOTE NE-183

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### A SIMPLE AND INEXPENSIVE PULSING DEVICE FOR DATA-RECORDING CAMERAS

*Abstract.*—In some areas of forestry and wood utilization research, use of automatic data recording equipment has become commonplace. This research note describes the basic electronic components needed to modify an existing intervalometer into a simplified pulsing device for controlling an automatic data recording camera. The pulsing device is easily assembled and inexpensive, when compared to similar proprietary units.

Pong et al. (1970) have developed an automatic photoelectric triggering mechanism for a pulse-operated data-recording 35 mm camera. The primary use of their camera system is to record information about individual pieces of lumber as they are produced in a sawmill. Incorporated in the system is a pulse generator, designed and built by the Pacific Northwest Forest and Range Experiment Station. The pulse generator is the "brain" of the camera system, and is quite expensive to build. This research note describes an inexpensive pulsing device built at the Northeastern Forest Experiment Station, for a similar use. The camera, remote triggering mechanism, and basic ideas all originated from the PNW Station. The only difference in our camera system is the pulsing device.

#### Definition

An intervalometer is an electrical device used for controlling various types of pulse-operated electronic camera equipment. It is a critical component in an electronic camera

system since the operation of the system is initiated by the pulse it generates through the closure of remote switches. Most data-recording cameras are operated by an electrical pulse of a given duration; a device that produces a pulse of the required duration may be extremely expensive to develop or purchase commercially.

Researchers at the Northeastern Forest Experiment Station have developed an inexpensive pulsing device using modified surplus equipment and available standard electronic components. This pulsing device will operate an Automax G-3, 35 mm Data-Recording Camera,<sup>1</sup> meeting the specific pulse and power requirements of the camera.

#### B-8B Intervalometer

The basis of this pulsing device is an Abrams B-8B intervalometer (fig. 1) used by the Air Force and readily available on federal

<sup>1</sup>Trade names are used for the convenience of the reader and do not imply endorsement by the U.S. Department of Agriculture.

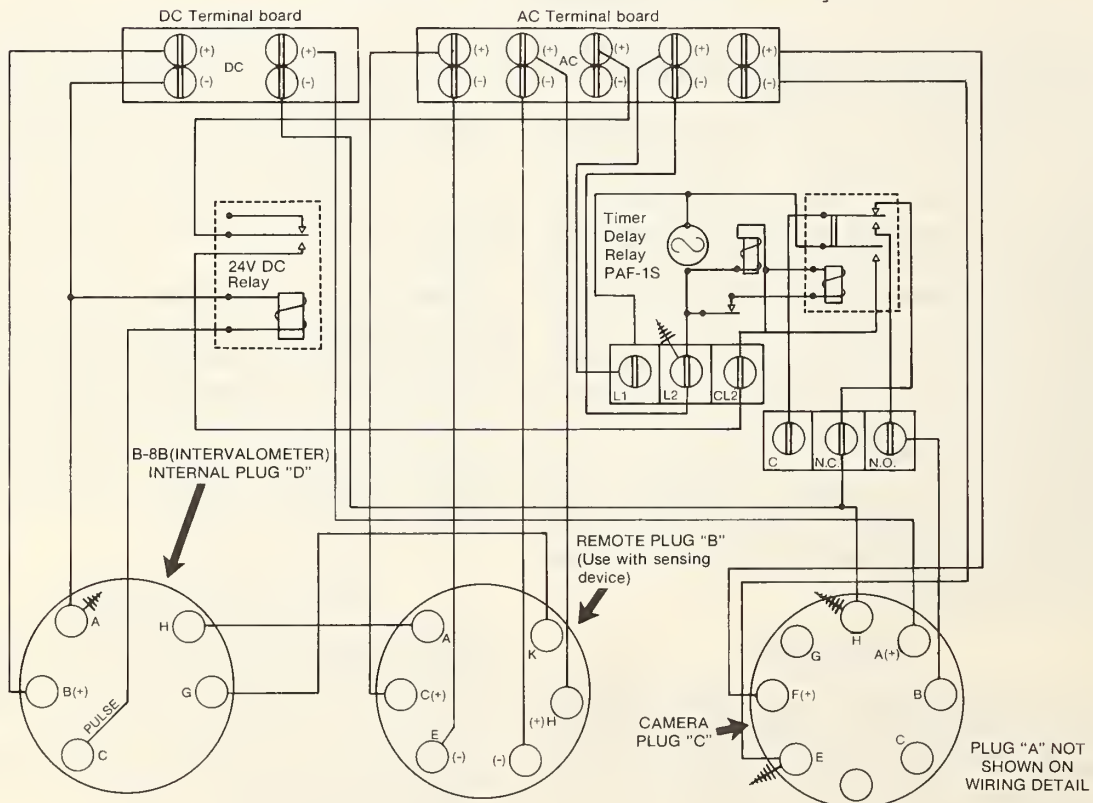
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Figure 1.—Type B-8B intervalometer, overall view.



surplus supply lists. The B-8B intervalometer, built by the Abrams Instrument Corporation, is designed to control aerial photographic cameras in bombardment aircraft. It is powered by a small external 24VDC power source wired to the B-8B intervalometer through amphenol plugs. The intervalometer has an initial delay time of 1 to 60 seconds and interval rates of 1 to 60 seconds. Other equipment visible on the face panel of the intervalometer are ready and operation lights, manual initiation and camera trip buttons, pulse counter, fuse, exposure limiter, and off switch. The unit produces a 1- to 2-second pulse at 24VDC for any delay and interval desired. Because the pulse generated by the B-8B intervalometer is not of proper duration to operate the data-recording camera directly, a series of relays were added to modify this pulse.

Figure 2.—Wiring detail of pulsing device showing terminal boards, relays, and plugs.





## General Purpose 24VDC Relay

The initial relay used in the pulsing device is a Potter-Brumfield, KA type, general-purpose 24VDC relay (fig. 2). It is SPDT, using the 24VDC pulse from the B-8B to operate the relay coil, with 110 VAC power across the relay points. It operates in an "open" configuration, with the 24VDC pulse from the B-8B activating the coil, closing the contacts and allowing 110 VAC power (1- to 2-seconds duration) to pass to the next relay.

## Automatic Reset Time Delay Relay

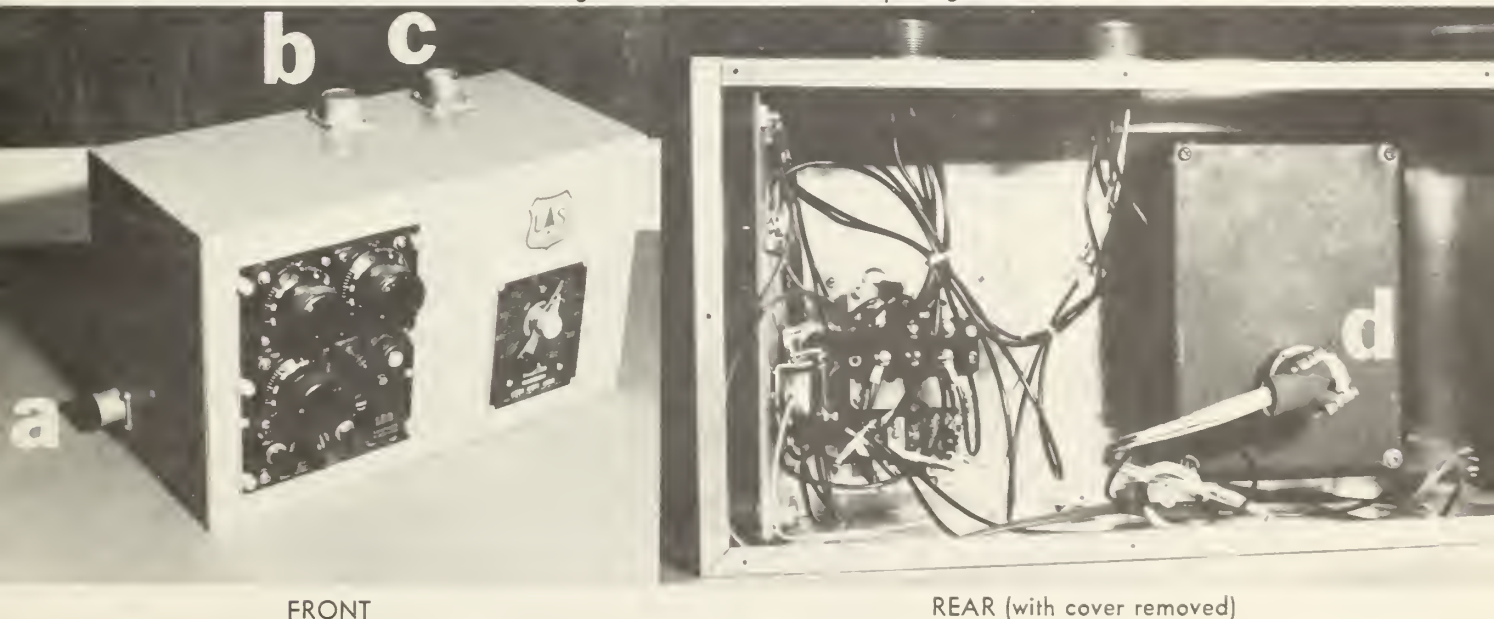
The second relay is an Industrial Timer, Series PAF-1S, panel-mounted interval timer (fig. 2). This particular model is a clutch-operated, automatic-reset timer relay operating on 110 VAC, 60 cycles, with a maximum time cycle of 1 second in 1/60 second increments. Since the 1- to 2-second (110 VAC) pulse from the previous general purpose relay is not of the proper duration or voltage to operate the data recording camera directly, the

automatic reset timer relay is used to generate an electrical pulse output of the proper voltage (24VDC) and duration (30-50 milliseconds) to operate the camera shutter and take-up motor of the data camera. The entire pulsing device is contained in a 15 x 9 x 7 aluminum box (fig. 3) with amphenol plugs for the external connections.

## Amphenol Plugs

Plug "A" (fig. 3) connects the 24VDC power pack and 110 VAC power line to the pulsing device. For automatic use of the unit, plug "B" (fig. 3) is used with any remote sensing device, such as photoelectric cells or micro switches. A manual switch may also be used for individual pulsing of the unit. Plug "C" (fig. 3) is the camera pulse plug which carries the 30-50 millisecond pulse to the camera. Plug "D" is the B-8B intervalometer plug (fig. 3, bottom) which connects the B-8B to the series of relays. It is internal and not accessible from outside the pulsing device. All connecting wires are 16 gage, shielded, stranded and covered with heat-shrinkable tubing.

Figure 3.—Overall view of the pulsing device.



## Camera

The data-recording camera used is an Auto-max G-3, 35 mm, single frame format (738 x .970), using a Mitchell Magazine with a capacity of 500 feet of film. The large roll gives a maximum of 7800 individual pictures with one load of the camera and magazine. The camera has a speed of 10 frames per second or 600 frames per minute.

## Use

The pulsing device and camera system were developed for use as a mechanical tally system to "back up" the hand tally of lumber. Grade marks, sawing order numbers, length, width and thickness of each board are photographed by the camera. The photographic data can then be used to check the hand tally.

The pulsing device and camera may have additional uses other than the particular one it was developed for. Because of its versatility and dependability, the camera system can be used for time lapse photography as well as high speed photography.

## Cost

The cost of purchasing or having constructed a commercial pulsing device that will satisfy all the camera system requirements is

\$800.00 to \$1,600.00. The overall cost of the pulsing device described in this paper is \$120.00, not including the cost of the surplus B-8B intervalometer and labor. Construction time is approximately 8 to 10 hours from start to finish.

The following list shows the individual components and cost of each:

|   |          |
|---|----------|
| B-8B Intervalometer (Surplus) . .             | \$ —     |
| Industrial Timer (Time-Delay Relay) . . . . . | \$ 47.50 |
| 24 VDC Power Pack . . . . .                   | 59.50    |
| Potter-Brumfield 24VDC Relay                  | 3.60     |
| Metal (Alum.) Box . . . . .                   | 6.90     |
| Shielded Wire (Conductor) . . . .             | 1.60     |
| Tubing (Shrinkable) . . . . .                 | 1.77     |
| 3 Cannon Plugs (Surplus) . . . . .            | —        |
| Total Cost . . . . .                          | \$120.87 |

For additional information contact the Northeastern Forest Experiment Station, 6816 Market Street, Upper Darby, Pa.

## Literature Cited

- Pong, W. Y., R. M. Bass, and H. D. Claxton.  
1970. AN AUTOMATIC PHOTOELECTRIC TRIGGERING MECHANISM FOR A DATA-RECORDING CAMERA. U.S. Forest Serv. Res. Note PNW-122, 11 p., illus.

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